

26 November 1975

MEMORANDUM FOR THE RECORD

SUBJECT: Project ORACLE, Redwood City Preshipment
Acceptance Test

The Redwood City Preshipment Acceptance Test was held for seven successive days over the period 19 November through 25 November 1975. There were 20 test periods, all of them failed. ✓

The test exercised both the software and hardware of the Mass Storage System in conjunction with a host computer, an IBM 370/155. The functions tested were mutually agreed to by AMPEX and the Agency on 3 July 1975. ✓
~~All individual tests but one were submitted in advance of the test period to AMPEX. The test set was delivered on 25 August 1975 and a revised set was delivered on 30 October 1975.~~ The tests actually run during the period differed from those previously submitted to AMPEX only in that the data content of the files had been altered. Altering the data content had no impact on the functional aspects of the test, it simply precluded any kind of pre-arrangement on the part of AMPEX.

but Test began 14 NOV 75 had had procedure in accordance
The acceptance test was conducted by the Agency, AMPEX personnel were present as observers. The Agency decided what functions were to be tested in a given period and in what sequence the individual tests were to execute. Agency personnel alone made the decision as to whether a test period was a failure or a success. ~~Criteria used to determine success or failure of functional tests were based solely on the Mass Storage System Design (Specification) dated 19 March 1975.~~ Whenever a test period ended because the system stopped processing, it was simply declared a failure. The Agency did not attempt to diagnose the cause as either hardware or software.

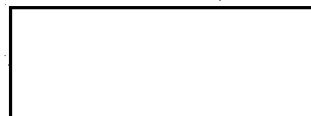
During each test period, the Agency had complete control of the system. At the end of a test period control was returned to AMPEX. After each test period, all events were reviewed, an evaluation of the test was made and then presented to AMPEX. Finally, a brief written summary of the test period was given to.

AMPEX which served to notify them of the results. We also retained the blow-by-blow detail in the form of machine console logs, printer output from the host computer, and handwritten logs of events that took place during each test. A new test period would be started only when AMPEX declared the system was ready and returned control to the Agency. Any changes made by AMPEX were noted so that we could determine if any tests needed to be rerun.

~~It is important to note that the nature of all the failures were clear-cut. It was not necessary to make any intensive studies of the specifications to probe for subtle interpretations. The failures encountered during the tests were both hardware and software related. AMPEX did not question any of the test evaluations.~~

There were two serious types of failures. ~~The first was the inability of the Mass Storage System to move some files from disk to the TBM Tape. These files could be manipulated successfully from the host computer. The second failure was the inability of the system to move some files from TBM Tape to disk.~~ The specification and the system design assumes this latter problem will occur once for each 2.5 billion characters of data. The test results showed a rate of 50 occurrences for each 2.5 billion characters.

Because of the short duration of the acceptance test and the limited number of functions being tested, the system should look better than it really is. Using this for a guideline and considering the poor quality revealed by the test, it is my judgement that AMPEX is not over half way done with the Mass Storage System.



COTR

STAT

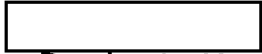
5 December 1975

MEMORANDUM FOR THE RECORD

SUBJECT: Project ORACLE, Detail of Redwood City PSAT

The Redwood City PSAT consisted of 20 test periods conducted over the period 19 November through 25 November 1975.

The following report contains verbatim excerpts and summaries of each test that have been taken from the Test Period Log. This information is under the headings, "Description of Test" and "Description of Test Results". After each test an analysis of its results were given orally to the AMPEX Project Manager. Finally, he was presented with a written Acceptance Test Report, each of the reports is reproduced and can be found under the heading, "Test Report".


COTR, Project ORACLE

STAT

Test Period 1
Date 11/19/75
Test Period Start 0945
Test Period End 1025

Description of Test

Run job JS01 to build 20 files
Flush both BSS Volumes
Run jobs JS02, JS03, JS04, JS05 to build 20 more and
compare them to the old ones
Flush both BSS Vols between jobs

Description of Test Results

System was IPL'd by Ampex
Gov't started MST
A set segment size to 135 secs
Gov't started job JS01
Sometime between the set segment message & the time when
the MST was ready to send the messages to MSS about
the new files, MSS died.

Test Report - Failure

Hardware failure

Test Period	2
Date	11/19/75
Test Period Start	1610
Test Period End	1910

Description of Test

Run job JS01 to create 20 files
Flush the files from the BSS Vols
Run job JS02, to create 1 file & compare it to old one
Flush the 2 files from the BSS

Description of Test Results

During Flush of 20 files, first file on BSS001 gave DSS I/F errors and subsequently remained on the volume.
AMPEX had to Flush BSS001 again to get the last file down-did not work.
Note: Flush command does not tell when it completes and whether or not it has flushed all files.
AMPEX Flushed BSS001 again-unsuccessful-DSS I/F errors on the one file.
AMPEX moved the volume and the plug to another spindle and tried to Flush again-still unsuccessful.
At the request of AMPEX, Government ran an OS/MVT job to: copy the file (T03F001) from its current position to another part of the disk. This job ran OK - OS/MVT had no problem in moving the file.

Test Report - Failure

1. Flush Command does not indicate the fact that all files were not flushed.
2. Data not descended, subsequently proved that it could be read by OSMVT.
3. The Flush Command does not verify the status of the files on the pack.
4. Flush Command does not indicate when it is complete.

Test Period 3
Date 11/20/75
Test Period Start 0900
Test Period End 1445

Description of Test - Section 1

Turn on Monitor Files
Run IEFBR14 in host to inform MSS of file (T03F001)
on BSS001.
Flush BSS001
Run jobs JS01 and JS02

Description of Test Results - Section 1

IEFBR14 ran ok
Flush BSS001 ok, communication messages successful
Started JS02-Job name is JMSPJ005
MSS got errors in ascending T03F001 which the Flush
had just descended
MSS cancelled JS02

Description of Test - Section 2

Turn off Monitor Files (AMPEX claims when ON, MSS
will blow)
Rerun job JS02

Description of Test Results - Section 2

Same result file T03F001 will not ASCEND.
No notification by the system (MSS) that the file was
not ascended.

Description of Test - Section 3

Set time segment to 135 seconds
Run JS03
Run JS04
Run job JS05 - to create 10 files and compare them to
the 10 that were descended yesterday.

Description of Test Results - Section 3

JS05 started
MSS allocated space and ascended all 10 files ok
MSS released JS05 to host computer
JS05 ended ok, files compared successfully
Flush BSS001 and BSS002 - ok
Start JS03 - JCL errors
Start JS04 -
MSS had error ascending 1 of 3 files on retry third
file ascended ok
3 files compared ok with 3 new files just created.
Flush BSS001 - 1 of 3 files unsuccessful
Flush BSS002 - ok
MST had error

Test Report - Failure

Job stream #2; failed
- a file could not be ascended from TBM tape
- MSS gave no notice that the file could not be
ascended

Job stream #5; successful

Job stream #3; not tested
- a JCL error prevented the test

Job stream #4; not tested
- previous testing by AMPEX, file names were already
in the OS catalog.

Job stream #4; successful

Test Period 4
Date 11/20/75
Test Period Start 1635
Test Period End 1920

Description of Test

Ran JS01, then flushed BSS Vol
Ran JS03
Re-ran JS03
Change transfer segment to 1 sec
Ran JS09
Run job \$1803MBL, to move 32 files from a user 3330 to
the BSS

Description of Test Results

MSS could not flush the file
Job JS03 had a JCL error & was cancelled, but MSS sent
a "setup complete" message for the job any way
MSS could not ascend 2 of the 6 files needed by JS03
The transfer segment cannot be changed to a value less
than 10 secs
MSS could not descend the file created by JS09
MSS aborted with dump as soon as job \$1803MBL ended

Test Report - Failure

Job stream #1; failed
The Flush Command was initiated, the file was not
descended, no notification was given that a problem
existed.

Job stream #3; failed
MSS erroneously sent a "set-up complete" message to
the HSS.

Two files that should have been ascended were not
ascended.

Job stream #9; failed

The segment break could not be set to 1 second. The Flush Command was initiated, a file was not descended, no notification was given that a problem existed.

Job stream #1803MBL; failed

When the job ended the MSS went down (aborted).

Test Period 5
Date 11/21/75
Test Period Start 0956
Test Period End 1040

Description of Test

Run job \$1803MBL again
Flush the BSS Vol

Description of Test Results

Job ran ok
MSS flushed 2 of the 32 files, then aborted with a dump

Test Report - Failure

Job stream #1803MBL; failed
Flush Command was issued, MSS aborted

Test Period 6
Date 11/21/75
Test Period Start 2343
Test Period End 0015 11/22/75

Description of Test

Run a "Fixit" job to inform MSS of the files that
were left on the BSS last test period
Flush the BSS Vol

Description of Test Results

Fixit ran ok

MSS was processing the Flush command.
Several files were flushed successfully. Three files
failed to be descended properly. MSS was processing
the flush command when it aborted with a dump.

Test Report - Failure

The Flush Command was initiated, MSS went down

Test Period 7
Date 11/22/75
Test Period Start 1200
Test Period End 1330

Description of Test

Flush 16 files from the BSS
Run JS01 to create 7 files and compare them with 7
files previously built.
Flush all files from both volumes

Description of Test Results

MSS cannot handle 16 files with a single Flush command.
It was necessary to initiate two Flushes, first time
got all but 1 file out of 8 files. Second Flush
for the remaining 8 files was ok. One error.

Ran JS02 successfully - created one file and good compare
MSS has two Display Commands for a file, one does not
work.

Ran JS02 again - created 6 files - ok
MSS ascended 1 file, it compared ok
Flush BSS002 - ok
Flush BSS001 - 6 files to go down - nothing
Could not communicate with MSS.

Test Report - Failure

The Flush Command caused 7 of 8 files to be successfully
descended, the eighth file could not be transferred to
TBM Tape.

The Flush Command caused 8 additional files to be
successfully descended

Job stream #JS01; successful

Job stream #JS02; successful

The Flush Command was issued to descend a file, nothing
happened.

Test Period 8
Date 11/22/75
Test Period Start 1645
Test Period End 1915

Description of Test

Ran a "fixit" job to inform MSS of the files on the BSS
Flushed the BSS
Ran JS03
Flushed the BSS
Flushed the BSS again
Run JS06
Run JS07

Description of Test Results

Fixit ran ok
Flush ran ok
JS03 ran ok
MSS couldn't flush 3 of the files created by JS03
MSS successfully flushed 2 of the 3 files on the
second try
MSS successfully processed JS06
MSS encountered many errors trying to ascend the files
needed for JS07

Test Report - Failure

Flush Command initiated; seven files descended successfully
Job stream #JS03; successful
Flush Command initiated; three files of six would not descend
Flush Command initiated; two of the remaining three files
were descended
Job stream #JS06; successful
Flush Command initiated; three files did not descend
Flush Command initiated; one file did not descend
Flush Command initiated; all files descended successfully
Job stream #JS07; failure
MSS could not ascend files that had been previously
descended with Read-Verify feature.

Test Period 9
Date 11/23/75
Test Period Start 1410
Test Period End 1520

Description of Test

Flush 1 BSS Vol
Flush the other BSS Vol
Run job JS07

Description of Test Results

MSS flushed the first BSS Vol OK
MSS had trouble flushing second BSS Vol - errors
trying to read 1 file, and completely ignoring
1 file.
MSS started processing requests from the MST for
jobs in jobstream JS07, then aborted with dump.

Test Report - Failure

Flush Command initiated; five out of five files descended
successfully
Flush Command initiated; failure to descend two files,
one file MSS notified it could not descend, the other
file - MSS did not notify that it could not descend
it. An OS/MVT job was run which successfully processed
the file that MSS said it could not descend.
Flush Command initiated; same result as previously
described.
Job stream #JS07; failure
MSS aborted.

Test Period 10
Date 11/23/75
Test Period Start 1720
Test Period End 1730

Description of Test

Ran job requesting file T03F029 from MSS

Description of Test Results

MSS sent a garbage message to the host
MSS then went into a loop

Test Report - Failure

A job was run that called for file T03F029 to be ascended.
MSS sent an incorrect message to the host computer.
MSS hung (looped)

Test Period 11
Date 11/23/75
Test Period Start 1805
Test Period End 1850

Description of Test

Ran a "Fixit" job to create a new file for MSS
Ran job JS07
Flush the BSS Vols

Description of Test Results

MSS went into a loop because return codes from the host are not analyzed yet (Ampex says this is recovery).
MSS processed JS07 OK
MSS bombed after descending the last file, before requesting the host to scratch the BSS space.

Test Report - Failure

While trying to clean up the BSS and MFD, WM went into a loop allocating file T03F029 because the return code is not sufficiently analyzed yet. Later a garbage volser was sent by WM. Finally, got file T03F029 into MSS correctly before starting the test.

Ran jobstream JS07. All files allocated in round-robin on BSS, i.e. alternated between 2 volumes, and all were ascended.

Purpose of JS07 was to check for priority allocation. However it was impossible to determine the internal queue structure of WM to see if there was more than one job ready for allocation at any time. Files were allocated in the order sent to MSS except for job-10 which was allocated before job-8 of lower priority, and one can conclude that priority was probably honored if more than one job was waiting.

Flushed BSS001 OK

Flushed BSS002 -- MSS aborted after descending the last file but before sending a scratch request.

Test Period	12
Date	11/23/75
Test Period Start	2120
Test Period End	2125

Description of Test

Run job JS08

Description of Test Results

JS08 is a job-stream of 9 jobs. MSS had started an ascend and was in the process of listing on the SCP Console those ascends that are queued (monitor files was on) when it aborted with a dump.

Test Report - Failure

Job stream #JS08; failure
MSS started an ascend and then aborted.

Test Period 13
Date 11/23/75
Test Period Start 2150
Test Period End 0005 11/24/75

Description of Test

Run job JS08
Flush BSS
Run job JS09
Run job JS10
Run job JS11
Run job JS12
Run job JS25
Run job JS26
Flush BSS Vol
Run "Fixit" job to inform MSS of a file on the BSS
Run job JS32
Run jobstream F1, F2, F3, F4

Description of Test Results

MSS failed to process the 9 jobs in JS08 correctly
Flush went OK
MSS processed JS09 OK
MSS processed JS10 OK
MSS failed to process JS11 correctly
MSS failed to process JS12 correctly
MSS processed JS25 OK
MSS processed JS26 OK
Flush went OK
MSS failed to process Fixit job properly
MSS processed JS32 OK
MSS aborted trying to process jobstreams F1, F2, F3, F4

Test Report - Failure

Job stream #JS08; failure
improper handling of file conflicts among jobs.
improper handling of priority classes of jobs.

Test Report - Failure Con't (Test Period 13)

Flush Command initiated; all files descended successfully
Job stream #JS09; successful
Job stream #JS10; successful
Job stream #JS11; failure
improper handling of priority classes of jobs.
Job stream #JS12; failure
did not recognize change in BSS definition of the
configuration.
Job stream #JS25; successful
Initiated Flush Command; all files descended successfully
Job stream #JS26; successful
Flush Commands initiated; all files on both disk drives
descended successfully.
Job stream # Fixit 27; failure
MSS improperly handled set-up for the job
MSS was IPL'ed
Job stream #JS32; successful
Job stream #F1, F2, F3, F4; failure
MSS aborted.

Test Period 14
Date 11/24/75
Test Period Start 1150
Test Period End 1345

Description of Test

Run job JS01
Flush BSS
Run jobs JS01, JS02, JS03, JS04

Description of Test Results

MSS processed JS01 OK
MSS could not flush 1 file -- it had to be copied to
another area on the disk before MSS could read it.
MSS aborted while processing requests from jobs JS01 -
JS04

Test Report - Failure

MSS aborted during ascends for jobstream JS04.
Jobstream JS01 ran ok creating 20 files.
BSS001 & BSS002 flushed ok after:
- deleting file T03F001
- allocating a dummy file on cylinder X '1C' of
BSS001 which could not be read.
- recreating file T03F001 by running JS01 again.
Jobs 2, 3, & 4 were cancelled correctly.
Jobstreams JS02, 3, 4, 5 were read before abort.

Test Period 15
Date 11/24/75
Test Period Start 1430 & 1645
Test Period End 1500 & 1705

Note: This test period in two parts because of host failure from 1500-1645 independent of MSS operations

Description of Test

Start monitor files & monitor jobs
Run jobs JS02, JS03, JS04, JS05

Description of Test Results

MSS aborted almost immediately after starting the 4 jobs. Ampex said they blew because monitoring both files and jobs creates so many messages that they can't handle it.

After IPL'ing & turning monitor files & jobs off, we started the same 4 jobs again
MSS aborted while processing requests for files for the 4 jobs

Test Report - Failure

Read in jobstreams JS02/3/4/5 - MSS aborted.
Re-ipld MSS and read in the same jobstreams without monitor files/jobs on (per Ampex) - MSS aborted.

Note: MSS does not handle the host startup message, MSS091, which makes restarts procedurally messy but this function is not being tested.
Two restarts of the host during this period due to host hardware.

Test Period 16
Date 11/24/75
Test Period Start 1715
Test Period End 1945

Description of Test

Run JS02, JS03, JS04
Flush BSS001
Run JS05, JS09, JS25
Flush BSS001
Run JS10, JS26
Flush BSS001
Run JS11
Flush BSS002

Description of Test Results

JS02, JS03, JS04 ran ok
Flush - ok
JS05, JS09, JS25 ran ok
Flush - all files but 1 descended
JS10, JS26 ran ok
Flush - all files but 1 descended
JS11 - failed to process FIFO within priority
Flush - ok

Test Report - Failure

Ran JS02, JS03, JS04, JS05, JS09 and JS25.
Tried to flush BSS001 -- could not descend J009F001.
Ran JS10 and JS26 ok
Ran JS11 - jobs were released by priority but LIFO
within priority should be FIFO.
Flushed BSS002 OK

Test Period	17
Date	11/25/75
Test Period Start	0845
Test Period End	0930

Description of Test

Run JS12
Run JS13
Run JS14

Description of Test Results

JS12 ran ok, then at end of job MSS did not honor free space thresholds and descended more files to tape than specified.
JS13 - ok
JS14 - MSS hung up during processing, it developed an interlock condition, required 100 cylinders only 90 cylinders available, processed it incorrectly.

Test Report - Failure

Ran JS12 - MSS started deallocation correctly but didn't stop until the pack was empty (thresholds were 200/300).
Ran JS13 ok.
Ran JS14. Due to a cylinder being deallocated on BSS001, MSS got into an interlock allocating files for the 2nd job. We need a full 403 free cylinders on the pack to correctly run this test.

Test Period 18
Date 11/25/75
Test Period Start 0950
Test Period End 1030

Description of Test

Run fixit job to scratch a file
Run JS13
Run JS12

Description of Test Results

MSS failed to update its internal space map when
file was scratched.
MSS incorrectly processed the files associated with
JS13.
While deallocating files associated with JS12, MSS
aborted

Test Report - Failure

Started up with a 250 cylinder file J009F001 on BSS001
which could not be descended. Ran a "fixit" to
delete the file and MSS did not realize that the
pack was then empty (thresholds were 200/300).
Ran JS13 and MSS incorrectly flushed the volume at
end-of-job (it should have stopped at 300 total free
cylinders).
Ran JS12 - MSS aborted during deallocation.

Test Period 19
Date 11/25/75
Test Period Start 1040
Test Period End 1120

Description of Test

Run JS12
Run JS13
Run JS14

Description of Test Results

MSS incorrectly deallocated all files on the BSS after JS12
MSS correctly processed JS13
MSS was in the process of processing requests from the 2 jobs that make up JS14, when it aborted.

Test Report - Failure

Ran jobstream JS12. Deallocation started at end-of-job correctly but it didn't stop until the pack was empty. Free space thresholds were 200/300.
Ran jobstream JS13 correctly.
Read in JS14. 1st job ran and MSS was deallocating files correctly until the last file for the second job was allocated and then aborted.

Test Period 20
Date 11/25/75
Test Period Start 1335
Test Period End 1345

Description of Test

Run JS12
Display file command

Description of Test Results

MSS started processing requests from JS12, but ignored some HSS requests. MSS aborted when DISPLAY File command was issued for 1 of the files.

Test Report - Failure

Read jobstream JS12.
Send allocates for 3rd & 4th files, none for 1st & 2nd.
MSS aborted when the command DISPLAY FILE=T03F007 was issued.